

Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

New approach for the study of linear Vlasov stability of inhomogeneous systems ENRICO CAMPOREALE, Queen Mary University, GIAN LUCA DELZANNO, LANL, GIOVANNI LAPENTA, LANL, WILLIAM DAUGHTON, University of Iowa — We have devised a new approach for the study of the linear Vlasov stability of inhomogeneous systems, alternative to the well-known integration over the unperturbed orbits. The perturbed distribution function is described as an infinite series of Hermite polynomials in velocity space, and the problem is reduced to an eigenvalue problem. A major advantage of the approach is that the direct physical meaning of the low-order coefficients is clear, and although the solutions are approximate (because of the truncation of the series) the accuracy of the solution appears to be merely a problem of computational power. Furthermore the method includes some free parameters, that can be properly set to reduce the computational effort (that is to reduce the number of polynoms needed in the series to reach good accuracy). This approach can be used for studying both growing or damping waves, as well as marginal stability. The method has been tested for an Harris sheet equilibrium and several instabilities (lower-hybrid drift, drift kink, tearing), showing good agreement with classical method [1]. Future work will involve the study of more realistic current equilibria proposed theoretically [2]. [1] E. Camporeale, G.L. Delzanno, G. Lapenta, W. Daughton, submitted. [2] E. Camporeale, G. Lapenta, J. Geophys. Res., Vol. 110, No. A7,A07206, 10.1029/2004JA0110779, 2005.

Giovanni Lapenta
LANL

Date submitted: 18 Jul 2006

Electronic form version 1.4